

WHAT IS CLAIMED IS:

1. A method of rendering wine heat-stable which comprises:
providing a fermentable material which is subsequently processed to produce wine; and
adding to at least one of the fermentable material or wine produced therefrom, prior to
bottling the wine, a protease that will hydrolyze proteins that cause heat-induced protein haze or
precipitate.
2. A method of rendering wine heat-stable according to claim 1, wherein the
protease is added to the wine.
3. A method of rendering wine heat-stable according to claim 1, wherein the
protease is added to the fermentable material.
4. A method of rendering wine heat-stable according to claim 1, wherein the
protease is derived from at least one of microbial sources, plants, and animals and is active over
a pH range of from about 2.5 to about 4.0.
5. A method of rendering wine heat-stable according to claim 1, wherein the
protease is added in an amount of from about 30 to about 900 mg per liter.
6. A method of rendering wine heat-stable according to claim 5, wherein the
protease is added in an amount of from about 120 to about 540 mg per liter.
7. A method of rendering wine heat-stable according to claim 1, wherein the
protease hydrolyzes proteins that cause heat-induced protein haze or precipitate above about
30°C.

8. A method of rendering wine heat-stable according to claim 7, wherein the protease hydrolyzes proteins that cause heat-induced protein haze or precipitate above about 60°C.

9. A method of producing an alcohol beverage which comprises the steps of:

- a) providing a fermentable fruit material;
- b) fermenting the fermentable fruit material under conditions sufficient to produce an alcohol beverage; and
- c) adding protease to at least one of the fermentable fruit material before fermentation and the alcohol beverage after fermentation to hydrolyze proteins that cause heat-induced protein haze or precipitate.

10. A method of producing an alcohol beverage according to claim 9, wherein the protease is added to the fermentable fruit material before or during fermentation to hydrolyze proteins that cause heat-induced protein haze or precipitate and to control foaming.

11. A method of producing an alcohol beverage according to claim 9, wherein the fermentable fruit material comprises at least one of grapes, apples, pineapples, peaches, pears, oranges, grapefruit, and berries.

12. A method of producing an alcohol beverage according to claim 9, wherein the protease is derived from microbial sources, plants, and/or animals, and is active at a pH of the fermentable material.

13. A method of producing an alcohol beverage according to claim 12, wherein the protease is derived from *Aspergillus niger*.

14. A method of producing an alcohol beverage according to claim 9, wherein the protease is added to the fermentable fruit material in an amount of from about 30 to about 900 mg per liter.

20220722 10085323 022207

15. A method of producing an alcohol beverage according to claim 9, wherein the protease hydrolyzes proteins that cause heat-induced protein haze or precipitate above about 30°C.

16. A method of producing an alcohol beverage according to claim 15, wherein the protease hydrolyzes proteins that cause heat-induced protein haze or precipitate above about 60°C.

17. A method of controlling foaming in a fermentation process which comprises the steps of:

- a) providing a fermentable material;
- b) fermenting the fermentable material under conditions sufficient to normally produce foam; and
- c) adding protease to the fermentable material before fermentation to control the production of foam.

18. A method of controlling foaming in a fermentation process according to claim 17, wherein the fermentable material comprises at least one of grapes, apples, pineapples, peaches, pears, oranges, grapefruit, and berries.

19. A method of controlling foaming in a fermentation process according to claim 17, wherein the fermentation produces at least one of beverages, enzymes, foods, feed ingredients, food supplements, pharmaceuticals, and bio-active materials.

20. A method of controlling foaming in a fermentation process according to claim 17, wherein the fermentable material is transferred and the protease prevents foaming of the fermentable material while it is being transferred.

21. A method of making wine which comprises the steps of:

- a) providing a fermentable fruit material;
- b) fermenting the fermentable fruit material under conditions sufficient to produce an alcohol beverage;
- c) removing solids from the fermented fermentable material; and
- d) adding protease to at least one of the fermentable fruit material before or during fermentation and the alcohol beverage after fermentation to hydrolyze proteins that cause heat-induced protein haze or precipitate.

22. A method of making wine according to claim 21, wherein the protease is added to the fermentable fruit material before or during fermentation to hydrolyze proteins that cause heat-induced protein haze or precipitate and to control foaming.

23. A method of making wine according to claim 21, wherein the protease is added to the fermentable fruit material before step c).

24. A method of making wine according to claim 21, wherein the protease is added in an amount of from about 30 to about 900 mg per liter.

25. A method of making wine according to claim 21, wherein the protease hydrolyzes proteins that cause heat-induced protein haze or precipitate above about 30°C.

26. A method of rendering wine heat-stable according to claim 25, wherein the protease hydrolyzes proteins that cause heat-induced protein haze or precipitate above about 60°C.

27. In a winemaking process which includes the use of bentonite to adsorb the heat-unstable proteins, the improvement comprising substituting at least a portion of the bentonite with a protease that hydrolyzes the heat-unstable proteins.

28. The winemaking process of claim 27, wherein the portion of bentonite that is substituted by the protease comprises about 50 to 90% of the bentonite.

29. The winemaking process of claim 27, wherein the portion of bentonite that is substituted by the protease comprises about 80 to 85% of the bentonite.

30. The winemaking process of claim 27, wherein the portion of bentonite that is substituted by the protease comprises at least about 30% of the bentonite.

31. The winemaking process of claim 27, wherein the protease hydrolyzes proteins that cause heat-induced protein haze or precipitate above about 30°C.

31. The winemaking process of claim 27, wherein the protease hydrolyzes proteins that cause heat-induced protein haze or precipitate above about 30°C.

32. The winemaking process of claim 31, wherein the protease hydrolyzes proteins that cause heat-induced protein haze or precipitate above about 60°C.

33. A method of controlling foaming during the processing of a liquid fruit material which comprises the steps of:

- a) providing a liquid fruit material that is subjected to processing step that normally causes foaming of the liquid fruit material; and
- b) adding protease to the fruit material fermentation to control the production of foam during the processing.

34. A method of controlling foaming during the processing of a liquid fruit material according to claim 33, wherein the liquid fruit material comprises at least one of a juice or juice concentrate.

20230320 15:59:01

35. A method of controlling foaming during the processing of a liquid fruit material according to claim 33, wherein the liquid fruit material is subjected to a fermentation process.

20250303 10:23:00